

RACIAL PROFILING? A MULTIVARIATE ANALYSIS OF POLICE TRAFFIC STOP DATA

MICHAEL R. SMITH

Virginia Commonwealth University

MATTHEW PETROCELLI

California State University–Hayward

Despite the significance of racial profiling as an issue of national concern, little empirical research exists on whether police traffic stop practices disproportionately impact minority drivers. Using data from 2,673 traffic stops conducted by the Richmond, Virginia, Police Department in 2000, this article explores the treatment by police of motorists of different races and ethnic backgrounds. Minority citizens in general, and African Americans in particular, were disproportionately stopped compared with their percentage in the driving-eligible population. However, they were searched no more frequently than Whites; in fact, Whites were significantly more likely than minorities to be the subjects of consent searches. Compared with Whites, and after controlling for variables, minority drivers were more likely to be warned, whereas Whites were more likely to be ticketed or arrested. Examining officer race as a predictor revealed White officers were no more likely than minority officers to stop, search, or arrest minority drivers.

Racial profiling is one of the most significant issues in American law enforcement today. The question of whether police intentionally target persons because of their race is increasingly being debated by law enforcement officials, civil rights groups, and ordinary citizens. Equally troubling in the eyes of many are aggressive police traffic stop (or stop and frisk) practices that may have a disparate impact on minorities even if they are not intentionally discriminatory. At least 10 states have passed laws requiring their law enforcement agencies to begin collecting data on the racial demographics of

POLICE QUARTERLY Vol. 4 No. 1, March 2001 4–27

© 2001 Sage Publications

motorists stopped by the police, and similar legislation has been introduced or is pending in a number of other states. Currently, U. S. Representative John Conyers (D-Michigan) is sponsoring the proposed Traffic Stops Statistics Act that would mandate the collection of race-related traffic stops data by all state and local law enforcement agencies.

Beginning in January 2000, the Richmond, Virginia, Police Department began collecting traffic stop data for the purpose of examining whether minorities were being disproportionately stopped, searched, or arrested by the Richmond police. Some of these data now serve as the basis for this article. In the article's first section, we briefly review the literature on the general treatment of minorities by police and on racial profiling specifically. The second section of the article describes in detail the methodology used to collect and analyze the data for this project. The third section presents the results of our analysis, and the article's final section is devoted to a discussion of our findings and of their implications for policy and future research.

BACKGROUND ON RACIAL PROFILING AND ON THE TREATMENT OF MINORITIES BY POLICE

RACE AND POLICING

Historically, minorities, and particularly African Americans, have had physical force used against them or have been arrested or stopped by police at rates exceeding their percentage in the population. Although the ratio of African Americans to Whites shot by the police has fallen in recent years, Blacks still outnumber Whites as victims of police gunfire by a ratio of 3:1 (Geller & Scott, 1992; Sherman & Cohn, 1986). Worden's (1995) analysis of data from the Police Service's Study found that police officers were most likely to use force against male African American suspects, who were overrepresented among all targets of police use force. However, recent use of force studies have found no correlation between suspect race and the frequency or amount of force used by police (Alpert & Dunham, 1999).

Even though African Americans comprise only 13% of the U.S. population, they accounted for nearly 30% of the total 1998 arrests, along with accounting for nearly one third of all property crime arrests and approximately 40% of all violent crime arrests (Federal Bureau of Investigation, 1998). Hepburn (1978) found that prosecutors were more likely to decline prosecutions involving African Americans than Whites, suggesting that more Blacks than Whites were arrested under conditions that would not

support formal prosecution. Examining data such as these, some have argued that the disparate treatment of minorities is the result of systemic discrimination by the criminal justice system (Mann, 1993). Others have found that race is usually not a factor in criminal justice processing and sentencing when all legal variables are taken into consideration and statistically controlled (Russell, 1998; Tonry, 1995; Wilbanks, 1987).

Long before racial profiling during traffic stops rose to the forefront of public concern, police stop and frisk practices were a consistent source of friction between police and minority communities. As early as 1975, disproportionate stops of minorities were documented in San Diego, California (Boydston, 1975). In recent years, the Christopher Commission (1991) found that the aggressive stop and frisk practices of the Los Angeles Police Department were a significant contributor to the preriot tensions between police and citizens in Los Angeles.

RESEARCH ON RACIAL PROFILING

Despite the perception among minorities of uneven treatment at the hands of police (Kennedy, 1997; Mann, 1993; "Report of the National Advisory Commission," 1968), empirical research on racial profiling is quite limited. One of the most comprehensive and methodologically sophisticated studies on racial profiling examined the stop and frisk practices of the New York City Police Department (NYPD) from January 1998 through March 1999 (New York Attorney General's Office, 1999). Researchers in this study found that although Blacks comprised only 25.6% of New York City's population, they accounted for 50.6% of all persons stopped by the NYPD. Hispanics were also overrepresented among persons stopped (23.7% of the population; 33% of persons stopped), whereas Whites were significantly underrepresented (43.4% of the population; 12.9% of persons stopped). Using Poisson regression, the researchers controlled for the different rates at which minorities commit criminal offenses (as measured by arrests) and still found that Blacks (23% more) and Hispanics (39% more) were stopped more frequently than Whites across all crime categories. Interestingly, minorities were stopped more often than Whites on suspicion of committing a violent crime and less frequently than Whites on suspicion of committing a property crime.

In December 1999, the San Jose (California) Police Department released the results of an analysis that it conducted of traffic stops in San Jose from July through September 1999. In San Jose, Hispanics make up 31% of the

city's population and accounted for 43% of the persons stopped by police during the study period. Blacks were stopped at slightly higher rates than their population would suggest (4.5% of the population; 7% of persons stopped), whereas Whites (43% of the population; 29% of persons stopped) and Asians (21% of the population; 16% of persons stopped) were under-represented among motorists stopped. The San Jose Police Department accounted for the higher stop percentages among Blacks and Hispanics by pointing out that more police officers are assigned on a per capita basis to minority areas of the city (because of a greater volume of calls for service) as compared with predominantly White areas of the city (San Jose Police Department, 1999).

As the result of litigation over the discriminatory traffic stop practices of New Jersey State Troopers, the State of New Jersey undertook a study of the stop and search activities of troopers in two state police districts. Examining the stops that occurred from April 1997 through February 1999, and including most of 1996 and a few months from 1994, a New Jersey Attorney General's team found that 627 of the 87,489 traffic stops involved a vehicle search. Of those searches, 77.2% involved Black or Hispanic motorists. During a similar time period, only 33.9% of the total traffic stops made in the two districts were of Blacks and Hispanics ("Interim Report of the State Police Review Team," 1999).

Similar search disparities were found by Lamberth (1997) in his study of the stop and search practices of the Maryland and New Jersey State Police. In a visual survey of traffic violators along the I-95 corridor through Maryland, Lamberth found that 17.5% of the speeding violators were Black, whereas 74.7% of the violators were White. However, of the 823 motorists searched along I-95 from January 1995 through September 1996, 600, or 72.9%, were Black. In other words, Blacks were being stopped and searched far more frequently than the rate at which they were speeding along the interstate.

Using municipal court records from Akron, Dayton, Toledo, and Columbus, Ohio, Harris (1999) examined racial profiling among police in those jurisdictions. Comparing the court record violator rates of Blacks and Whites with their percentage in the Ohio driving population, Harris found that Blacks were at least twice as likely as non-Blacks to be ticketed by police. However, in a recent report released by the Florida Highway Patrol, Florida troopers were found to have stopped Whites, Blacks, and Hispanics in the State of Florida at rates roughly equivalent to their percentages in the population. During the first 4 months of 2000, Blacks constituted 15.7% of

persons stopped and represented 13.6% of the Florida population. Hispanics were somewhat overrepresented among persons stopped, accounting for 17.9% of the stops but only 12% of the population. Whites were stopped at rates nearly identical to their overall percentage in the population (Florida Highway Patrol, 2000).

Most recently, a Vehicle Stop Study from the San Diego (California) Police Department has become available (San Diego Police Department, 2000). Using census data for comparison purposes, the researchers in that study found that both African Americans and Hispanics were overrepresented among persons stopped, searched, and arrested by the San Diego Police. They point out, however, that because of San Diego's proximity to Mexico, census data on the driving-eligible population may not be accurate and may significantly underrepresent the percentage of Hispanic drivers in San Diego.

With the exception of the New York study, most of the existing research on racial profiling has been descriptive in nature and has been conducted by law enforcement agencies or interest groups. This research has not been subjected to peer review, nor has it been published in academic or scholarly journals. In addition, none of the prior studies on racial profiling located during this literature review examined officer race as a predictor variable. Although to varying degrees all of the studies found that minorities were stopped or searched in percentages greater than their population or involvement in crime or traffic violations would warrant, none of the studies was able to determine whether these differential stop and search rates were the result of differential treatment of minority citizens by White officers. Some of the analyses in this article correct for this shortcoming by taking into account officer race as a potentially explanatory variable in traffic stop situations.

DATA, METHODS, AND LIMITATIONS

Traffic stop data collection began in Richmond on January 17, 2000. All officers equipped with mobile data computers (MDCs) in their automobiles were required to enter preselected traffic stop data directly into their laptop computers. These data were captured by the city's Department of Information Technology, and ultimately, 6 weeks' worth of data (February 14 to March 31, 2000) were made available for analysis.¹ Below is a list of the fields that were captured during the data collection effort (see Table 1). A complete description of the data fields can be found in the appendix. For

TABLE 1. Traffic Stop Data Fields Collected by Richmond, Virginia, Police From February 14 to March 31, 2000

<i>Driver Fields</i>	<i>Event Fields</i>	<i>Officer Fields</i>
Age	Time of stop	Age
Race	Reason for stop	Race
Gender	Location of stop	Gender
	Disposition of stop	Years of service
	Search conducted?	
	Type of search	

officers, age and years of service were captured on an ordinal scale. This was done to further assure the anonymity of individual officers. In addition to the below-listed case-based information, census tract-level data also were collected that included the population racial demographics and reported crime for each of the city's 70 census tracts. These data served as the basis for several analyses, the results of which appear below.

With the exception of specialty vehicles such as motorcycles or rental cars, all Richmond police cars were equipped with MDCs. The city estimates that no more than 110 out of the 4,329 traffic stops made during the 6-week period for which data were provided involved non-MDC equipped police vehicles. Furthermore, a comparison of the city's computer-aided dispatch (CAD) records with the officer-initiated data entries showed that officers complied with the data collection protocol in approximately 64% of the traffic stops made during the 6-week period for which data were obtained. For the remaining 36% of traffic stops that were conducted during the February 14 through March 31, 2000, time period, no profiling data were entered by the officers.

Given the sensitive nature of the study and the number of traffic stops made daily, a 64% response rate was somewhat higher than expected. Nonetheless, the missing data represent a potentially different pool of traffic stops, and so our findings should be interpreted with caution. As racial profiling continues to be the focus of public debate, more research will hopefully become available against which to compare the findings from this study.

The city's driving-eligible population (age 16 and over) served as the main comparison group for our analysis. Because this study analyzed traffic stop data, an obvious population against which to make demographic comparisons would have been the city's population of licensed drivers.

However, demographic information was not available from the Virginia Department of Motor Vehicles for this population. Instead, U.S. census data on the city's population of persons 16 years of age and older was used as a proxy because persons must be at least 16 years old in Virginia to obtain a driver's license. According to the 1990 census, the Richmond Police Department serves a city whose population of persons 16 years of age and older is 51% Black, 48% White, and 1% persons of other races.

Of course, the 1990 census is now 10 years old and soon will be replaced by the 2000 census. Nevertheless, it was the most readily available data on which to base the analyses contained in this article. Although Richmond has not appeared to have undergone any large-scale demographic or economic shifts in the past 10 years, it is possible that the racial make-up of the city may have changed since 1990. If previous trends hold true, the city's current population has likely become slightly smaller and is composed of a greater percentage of minorities (predominantly African Americans) as compared with 1990. Because minority groups other than African Americans comprise such a small percentage of the city's population (less than 3,000 people), they were sometimes combined for analytical purposes with the African American population into a category labeled "All Minorities."

Several additional limitations to the data should be acknowledged. To begin with, the duration of the period for which data were provided for analysis was fairly short (6 weeks). Although we have no reason to believe that the data are unrepresentative, a longer data collection period would have been preferable and would have accounted for potential seasonal variations in traffic stop practices. Second, the data analyzed for this article were obtained from officer self-reports. Although self-reports are a common source of information in criminal justice and police research (Garner, Buchanan, Schade, & Hepburn, 1996; Garner & Maxwell, 1999; Snyder & Sickmund, 1999), the sensitive nature of these data heightens concern over their validity.

As a result, subject reactivity (Neuman, 1997) remains a distinct threat to the validity of our findings. Given the publicity surrounding the issue of racial profiling, police officers will likely be suspicious of any traffic stop data collection effort that requires them to record information on driver race. However, because we know of no practical method for surreptitiously collecting traffic stop profiling data, agency-generated records will continue to be the only viable source of data for profiling research. In this case, the Richmond Police Department made a good faith effort to assure officers that the information reported would not be used against them for

disciplinary purposes. In fact, the chief of police and a department attorney met with all of the patrol roll calls before the study began to explain its purpose and to allay any fears that the data collected would be used to target individuals for punishment. These efforts were specifically designed to increase compliance with the data collection protocol and to improve the accuracy of the information gathered.

More important, our analyses do not include baseline data on the percentage of minority and White motorists actually driving within the city of Richmond or on the percentage of traffic violations committed by persons of the various races. Instead, we compare stop percentages of racial groups with their prevalence in the 16-and-over population. Although it is possible that minorities commit more traffic violations per capita than Whites, thus helping to explain a higher minority stop rate, this possibility appears unlikely.

To begin with, Lamberth's (1997) racial profiling studies in New Jersey and Maryland, which used field observation to catalogue driver and violator race on I-95, found that Blacks and Whites violated traffic laws (speeding) at the same rates (Harris, 1999). Furthermore, self-report measures have consistently shown that minorities commit minor crimes and delinquent acts at approximately the same rates as Whites (McNeely & Pope, 1981; Snyder & Sickmund, 1999). Given that traffic violations are perhaps the most minor of offenses, the available evidence suggests that total traffic infractions will be distributed among minorities and Whites in approximately the same proportions as these racial groups are constituted within a given population.

Whether Blacks and Whites actually drive in proportion to their populations within the city of Richmond is an open question and cannot be answered with the available data. However, absent the availability of accurate, baseline operator and traffic violator data by race, the driver's license-eligible population within Richmond appears to be a logical group against which to compare the demographics of those stopped by the Richmond police.

In fact, comparisons using census data will likely continue to be the norm in racial profiling research. Establishing baseline operator and violator data is time consuming, expensive, and may be no more accurate than using census data. Lamberth (1997), for example, used "rolling" surveys to identify the race of operators and speeding violators along a defined stretch of I-95. However, establishing these figures for one portion of the interstate does not mean that other stretches of the same or a different interstate within the same state will yield the same results.

TABLE 2. Racial Breakdown of Traffic Stops and Driving-Eligible Population in Richmond, Virginia, From February 14 to March 31, 2000

	<i>No. of Stops</i>	<i>Percentage of Total Stops</i>	<i>Percentage of Driving Population</i>	<i>Difference</i>
Whites	859	32.1	48.0	-15.9
Blacks	1,717	64.2	50.6	13.6
All minorities ^a	1,814	67.9	51.9	16.0

a. Includes Blacks, Hispanics, Asians, Native Americans, and Middle Easterners.

Moreover, establishing baseline rates for a large county or municipality is even more difficult due to the extreme variations in racial composition between different geographic areas or neighborhoods within the same political subdivision. Unlike an interstate highway, cities are not defined areas of physical space with limited and controlled access. In addition, observational strategies, such as the one used by Lamberth (1997), are suspect. Driver race can only be observed during daylight hours, and even then, the accuracy of such observations is questionable. Physical differences between persons of different racial or ethnic groups are not always easily discernible, particularly when the person being observed is driving by in an automobile. How does a researcher distinguish between a person of Italian versus Hispanic descent, or a dark-skinned person of Arab descent from an African American? Because of the difficulties in gathering accurate baseline data, researchers will likely continue to use census data as a proxy for actual operator and violator data.

ANALYSIS

RACE AND THE DECISION TO STOP

Table 2 shows the racial breakdown by percentages of the 2,673 traffic stops included within the sample. Both Blacks and minorities in general (including Blacks) were stopped more frequently by the Richmond police than their relative percentages in the population. Blacks comprise 51% of the city's 16-and-over population but accounted for 64.2% of the motorists stopped. The city's combined minority population 16 and older is 52%, but minorities made up more than two thirds of the stopped motorists. Across all census tracts, the average Black stop rate of 57 stops per 1,000 Black

citizens was 46% higher than the average White stop rate of 39 stops per 1,000 White citizens.

As in most of the previous studies on race and traffic stops by police, the available data (with their limitations) indicate that minority citizens in Richmond are stopped more frequently on a per capita basis than White citizens. The San Jose Police Department (1999) argued that minorities were over-represented among persons stopped because more police officers were assigned to minority areas than White areas, thus increasing the likelihood of police-citizen encounters. A greater police presence in minority neighborhoods is needed, according to the San Jose report, because of the higher volume of calls received from such neighborhoods.

The question of whether a higher concentration of police in minority neighborhoods explains the disparity in White and minority stop percentages in Richmond is difficult to answer. Patrol personnel are deployed throughout the city of Richmond according to beat assignment. Police beats frequently cut across census tract boundaries and often encompass all or parts of several census tracts. Determining whether more patrol officers are assigned to predominantly minority areas of Richmond than to predominantly White areas would require accurate demographic data at the police beat level. Unfortunately, these data do not exist.

However, an examination of the available census tract data reveals that neither the number of overall stops (Pearson's $r = .177$, $p = .142$) nor stop rates (Pearson's $r = -.113$, $p = .353$) is correlated with the percentage of African Americans living within the 70 census tracts. Although beat-level demographics may be different, census tract data show no increase in traffic stops as the Black population increases, as one would expect if more Richmond police officers were deployed in heavily minority neighborhoods compared with predominantly White neighborhoods. Again, definitive conclusions about the effect, if any, of police deployment practices on racial stop percentages cannot be drawn without beat-level demographic data.

One of the most troubling aspects of racial profiling is the singling out of minorities for stops based solely on their suspected involvement in criminal activity. Implicit in this alleged practice is the disproportionate involvement of White officers in stopping minority drivers. Table 3 presents a logistic regression analysis of the salient variables that might potentially predict the race of a stopped motorist. Variables in the model include the time of the stop, whether the stop was for investigatory purposes (based on "suspicion"), the Part I crime rate (per 1,000 population) of the census tract where

TABLE 3. Factors Predicting Stopped Driver's Race in Richmond, Virginia, From February 14 to March 31, 2000 (*N* = 2,673)

	<i>Driver Race</i> ^a		
	<i>B</i>	<i>Significance</i>	<i>Odds Ratio</i>
Time of stop	-.017**	.006	0.983
Investigatory stop	-.306	.181	0.736
Crime rate	.000	.392	1.000
Officer gender ^b	-.493**	.004	0.611
Officer age	.252**	.000	1.287
Officer years of service	.041	.437	1.042
Officer race ^a	.189	.091	1.207

Note: Model chi-square = 117.812, *p* < .01. Nagelkerke R-square = .066.

a. 0 = minority, 1 = White.

b. 0 = female, 1 = male.

***p* < .01.

the stop occurred, and the race, age, gender, and years of service of the officers making the stops.

Significant predictors in the model included the time of the stop, officer gender, and officer age. The time at which the stop occurred was negligibly associated with the race of the motorist stopped. In contrast, officer gender was much more strongly associated with motorist race. Overall, female officers stopped 104 minority drivers and 71 White drivers, yielding a minority-to-White stop ratio of 1.46:1. In contrast, the minority-to-White stop ratio among male officers was significantly higher at 2.17:1 (1,710 minority drivers stopped vs. 788 Whites). The odds ratio from Table 3 illustrates this difference. All things being equal, a stop made by a male officer decreased the likelihood that the driver would be White by 39%.

Officer age was positively correlated with driver race. The distribution of stops among the various officer age groupings shows a clear pattern of older officers stopping more White drivers relative to younger officers. For example, officers in the 46 to 50 age group stopped more White drivers than minority drivers (116 Whites, 72 minorities). This pattern was reversed among officers in the 26 to 30 age group who stopped more than 3 times as many minority motorists as White motorists (838 minorities, 275 Whites). Thus, the logit model in Table 3 indicates that as officer age increased, the odds that the driver stopped would be White also increased by 28.7%.

As with the disparity between Black and White stop percentages, police deployment patterns may explain the differences found between male and

female officers and between younger and older officers. It is not uncommon for younger, male officers to be assigned to a city's high-crime areas (Walker, 1999). Historically, female officers have been viewed as physically and emotionally weaker than their male counterparts and thus unable to handle the rigors of uniformed patrol (Martin, 1980). For the same reasons, older officers also may be assigned to beats that are viewed as quieter and less demanding.

In Richmond, the average Part I crime rate (per 1,000 population) is 45% higher in majority African American census tracts compared with majority White census tracts. If Richmond police deployment practices reflect the considerations discussed above, then one would expect to find female and older officers disproportionately assigned to areas of the city that are populated by relatively fewer minorities because such areas are thought to have less crime and produce fewer calls for service. Such deployment practices would explain the differences seen in the logistic regression analysis between older officers and younger officers and between male and female officers. More research is needed to further explore these differences.

Significantly, neither officer race nor whether the stop was made for investigatory purposes predicted the race of the stopped motorist. Thus, the data offer no support for the proposition that minorities were disproportionately targeted for suspicion-based stops by the Richmond police, as for example, occurred in New York City (New York Attorney General's Office, 1999). The significance level for the officer race variable was well above the accepted cutoff level in the social sciences of .05. Even if it were closer to the .05 level, the direction of the association between officer and driver race was positive, indicating that the involvement of a White officer actually increased the odds that the driver also would be White rather than a minority. Although these findings provide an interesting contrast with previous studies, they should be regarded as preliminary until further research with better data controls can be undertaken.

RACE AND THE DECISION TO SEARCH

Out of the 2,673 traffic stops recorded during the 6-week data collection period, officers reported conducting searches in 211, or 7.9%, of stops. Minorities were searched 8.3% of the time when stopped, which was not significantly different ($\chi^2 = 1.093$) than the percentage of Whites who were searched (7.1%). Given the findings from New Jersey and Maryland that minorities in those states were searched at rates far exceeding the

TABLE 4. Type of Search by Driver Race in Richmond, Virginia, From February 14 to March 31, 2000

	<i>Driver Race</i>		<i>Totals</i>
	<i>White</i>	<i>Minority</i>	
Consent	42 (68.9%)	70 (46.7%)	112
Incident to arrest	14 (23.0%)	61 (40.7%)	75
Inventory	0	10 (6.7%)	10
Pat-down	5 (8.2%)	9 (6.0%)	14
Totals	100%	100%	211

rates at which they were stopped, it is important to note that the percentage of searches involving minorities in Richmond (71.1% of all searches conducted) was only slightly higher than the percentage of minorities stopped (67.9%).

Another important racial profiling issue is whether minorities are subjected to different kinds of searches compared with Whites. Specifically, were police more likely to perform consent searches on minorities for the alleged purpose of uncovering drugs or weapons? As the descriptive data from Table 4 indicate, Whites were more likely than minorities to be the subjects of consent searches and were also more likely to be the subjects of pat-down searches. Minorities, on the other hand, were more likely than Whites to be searched incident to arrest or to have their vehicles inventoried.

The higher percentage of minority searches incident to arrest (compared with Whites) may be accounted for by the higher percentage of minorities subjected to criminal arrest. Minority citizens comprised 78.5% of the total number of criminal arrests ($n = 555$) made during the data collection period. Viewed another way, minorities accounted for 77.9% ($n = 352$) of the 452 traffic stops that produced at least one criminal arrest. Thus, they were far more likely than Whites to be criminally arrested and therefore potentially subjected to searches incident to arrest.²

Table 5 is a logistic regression model of factors predictive of consent searches. Consent searches made up approximately one half of all searches conducted by the Richmond police ($n = 112$). The type of violation (moving vs. nonmoving) and driver race were the only significant predictors of whether a consent search was conducted. Drivers stopped for a moving violation were almost 80% more likely to be the subjects of consent searches than drivers stopped for vehicle defects or for investigatory purposes. This finding is consistent with police profiling practices that use minor moving

TABLE 5. Logistic Regression Model of Factors Predicting a Consent Search in Richmond, Virginia, From February 14 to March 31, 2000 (*n* = 211)

	<i>Consent Search^a</i>		
	<i>B</i>	<i>Significance</i>	<i>Odds Ratio</i>
Moving violation ^b	.583*	.046	1.792
Officer gender ^c	-.087	.898	0.917
Officer age	.139	.390	1.149
Officer years of service	-.388	.111	0.678
Officer race ^d	-.130	.717	0.878
Driver year of birth	-.015	.229	0.985
Driver gender ^c	-.169	.660	0.844
Driver race ^d	.878**	.009	2.406

Note: Model chi-square = 18.079, *p* < .05. Nagelkerke R-square = .110.

a. 0 = search other than consent, 1 = consent.

b. 0 = no, 1 = yes.

c. 0 = female, 1 = male.

d. 0 = minority, 1 = White.

p* < .05. *p* < .01.

violations as a pretext to stop motorists and seek consent to search their automobiles (*Whren v. United States*, 1996).

However, if moving violations were used as the means for seeking consent to search, minority drivers were not the likely subjects of these searches. In fact, White drivers were almost 2½ times more likely than minority drivers to be the subjects of consent searches by the Richmond police. Officer race was not a significant predictor of a consent search.

Cultural differences between minorities and Whites, including lack of trust in the police, may explain why minorities were significantly less likely than Whites to be the subjects of consent searches. Minorities generally view the police less favorably than Whites, are less confident in the police than Whites, and are less likely than Whites to sanction police use of force (Flanagan & Vaughn, 1995). Because of these cultural differences, minority motorists in Richmond may simply have been less likely than Whites to grant consent to the police to search their automobiles.

Another potential explanation may lie in the nature of Richmond's street-level drug market. As in many cities, street-level drug dealing in Richmond is disproportionately concentrated in minority neighborhoods. White drug purchasers, many of whom drive to minority neighborhoods to obtain drugs, easily draw police attention. Patrol officers who work in these neighborhoods soon learn to be suspicious of White persons cruising the

streets of Black neighborhoods, particularly after dark. Traffic stops of such persons are common and are often accompanied by requests to search the stopped automobiles.

RACE AND THE DECISION TO ARREST

Overall, minority drivers made up 62.9% ($n = 995$) of all persons ticketed or criminally arrested during the 6-week¹ data collection period. This was slightly less than the percentage at which they were stopped (67.9%) and considerably less than the percentage at which they were arrested citywide in 1999 (81.2% of all arrests). White drivers comprised 37.1% of those ticketed or arrested during the data collection period, compared with 32.1% of persons stopped.

The ratio of stops to arrests was higher among minorities than it was for Whites. The Richmond police stopped 1.8 minorities for every ticket issued or arrest made compared with 1.5 Whites. Examining the ratio of arrests/summonses to warnings for the various racial groups indicates that minorities were significantly more likely than Whites to be warned rather than arrested or issued a summons. Among minorities, police made 1.2 traffic or criminal arrests for every warning given, whereas among Whites the ratio was 1.95:1.

Table 6 presents a logistic regression analysis to further examine this issue. In this model, a stop was coded as 1 if any of the three possible recorded dispositions involved an arrest or a summons ($n = 1,445$).³ A stop was coded as 0 if at least one of the dispositions was a warning and none of the other dispositions involved an arrest or summons ($n = 976$). Stops that involved neither an arrest nor a warning were coded as missing and played no role in the analysis ($n = 252$). Consequently, this model examines the 2,421 traffic stops in which officers decided between invoking a legal sanction or issuing a warning.

Significant predictors in the model included the Part I crime rate of the area where the stop occurred, officer years of service, driver year of birth, and driver race. Again, officer race was not a significant predictor of a punitive outcome. Although area crime rate and driver year of birth were statistically significant, their effect on increasing or decreasing the odds of a legal sanction was negligible at .1% and 1.1%, respectively. On the other hand, a single unit change in officer years of service increased the odds of a legal sanction by approximately 37%. Thus, more experienced officers were

TABLE 6. Factors Predicting Legal Sanctions or Warnings From Stops Made in Richmond, Virginia, From February 14 to March 31, 2000 ($n = 2,421$)

	<i>Legal Sanction Versus Warning^a</i>		
	<i>B</i>	<i>Significance</i>	<i>Odds Ratio</i>
Crime rate of stop location	-.001**	.001	0.999
Officer's gender ^b	.066	.705	1.068
Officer's age	.032	.439	1.032
Officer years of service	.318**	.000	1.374
Officer's race ^c	.031	.768	1.032
Driver year of birth	.011**	.001	1.011
Driver gender ^b	-.053	.548	0.948
Driver race ^d	-.410**	.000	0.664

Note: Model chi-square = 139.986, $p < .01$. Nagelkerke R-square = .076.

a. 0 = warning, 1 = arrest/summons.

b. 0 = female, 1 = male.

c. 0 = minority, 1 = White.

d. 0 = White, 1 = minority.

** $p < .01$.

more likely than less experienced officers to write summonses or make arrests.

Previous research has found that more older, more experienced officers do less work and are generally less aggressive than younger officers with fewer years of service (Sherman, 1980). This finding suggests that as a means of workload management, more experienced officers might be less likely to write tickets or make arrests than less experienced officers. However, early work by McNamara (1967) and Niederhoffer (1967) found that cynicism among officers increases as they gain more experience. Higher levels of cynicism among experienced officers, which manifest themselves in "hard-nosed attitudes" toward the public, might account for the greater probability of a punitive disposition among more experienced officers.

The strongest correlate with a punitive disposition was driver race. A minority driver as a variable decreased the odds of a punitive disposition occurring by a third. Put another way, minority drivers were 50% more likely than White drivers to receive a warning rather than be subjected to a legal sanction.

The finding that minorities in Richmond were more likely than Whites to be warned rather than legally sanctioned is capable of several interpretations. For example, this finding may indicate that Richmond officers altered

their behavior because of the research study. Such subject reactivity (Neuman, 1997) might also explain why White officers were no more likely than Black officers to stop Black motorists. In other words, it is possible that officers “cleaned up their act” while the research was under way.

An alternative explanation for the finding that minorities were more likely than Whites to be warned by the police is that minorities may have been stopped more frequently than Whites based on weak (or nonexistent) evidence. Consistent with racial profiling practices, Richmond officers may use minor traffic infractions as a pretext to stop minority motorists; once their suspicions are dispelled, they may send those minority drivers on their way with only warnings to show for the experience. This explanation is consistent with Hepburn’s (1978) conclusion that minorities were more likely than Whites to be arrested under conditions that would not support the bringing of formal charges. Similarly, Richmond officers may be more likely to stop minorities than Whites for reasons that will not support the issuance of a traffic summons.

COMMENTARY AND SUGGESTIONS FOR FUTURE RESEARCH

Throughout this article we have acknowledged the limitations of the data used in the foregoing analyses and have cautioned that our findings must be considered preliminary. Although our findings may change with the availability of more and better data, the current data show that minority motorists in Richmond were more likely than Whites to be stopped on a per capita basis. However, after controlling for other relevant variables, officer race did not predict the race of a stopped motorist. White officers did not disproportionately stop minority drivers, nor were minorities disproportionately targeted for investigatory or suspicion-based stops. Officer age and gender were statistically significant predictors of a stopped driver’s race, with younger and male officers more likely to stop minorities than older and female officers. Police deployment practices that place younger, male officers in high-crime areas heavily populated by minorities may help to explain this finding (Walker, 1999).

The data show that once stopped, minorities were no more likely than Whites to be searched by police. However, White drivers were almost 2½ times more likely than minority drivers to be the subjects of consent searches, which are frequently used by police in an attempt to locate drugs and other contraband in automobiles. Greater levels of police distrust may explain why minorities were less likely than Whites to be the subject of

consent searches (which quite obviously require consent) (Flanagan & Vaughn, 1995), as might the common practice of stopping and searching White motorists whom police suspect of purchasing drugs in minority neighborhoods.

Consistent with Niederhoffer's (1967) and McNamara's (1967) findings of higher levels of cynicism among experienced officers, Richmond officers with more years of service were more likely than less experienced officers to act punitively toward motorists. Finally, Whites were significantly more likely than minorities to be arrested or issued a ticket, whereas minorities were more likely than Whites to be let go with a warning. One explanation for this finding consistent with previous research (Hepburn, 1978) may be that minorities were more likely than Whites to be stopped for reasons that would not support issuing a summons or making an arrest.

Although the disparities in treatment between Whites and minorities were not as extreme in Richmond as in other jurisdictions, (e.g., New Jersey and Maryland), one conclusion to be drawn from the present analyses is that minorities are being disproportionately targeted for traffic stops by the Richmond police. The absence of officer race as a predictor variable in any police decision analyzed, however, suggests that if inappropriate racial profiling is occurring, then discrimination in Richmond has transcended racial boundaries and has truly become a problem for all police officers regardless of their race.

An alternative explanation for the disproportionate percentage of minority stops and warnings in Richmond is that police traffic stop practices may understandably reflect the environment in which Richmond police officers function. In 1999, African American suspects made up 89% of Richmond's 38 homicide arrests. They also accounted for 86% of the aggravated assault arrests and 90% of all robbery arrests. At least among these categories of serious violent crimes, arrest figures closely track self-report and victimization data and thus provide a reasonably accurate approximation of offending rates among racial groups (Hindelang, Hirschi, & Weiss, 1979; Menard, 1987; Osgood, O'Malley, Bachman, & Johnston, 1989; Reiss, Roth, & Miczek, 1994; Tonry, 1995).

As disturbing as these arrest figures may be, their significance is surely not lost on the average Richmond patrol officer. Experience teaches Richmond officers that most of the persons whom they arrest will be African American. Moreover, sociological explanations of minority involvement in crime such as poverty, racism, or lack of educational opportunities are largely irrelevant in the everyday working life of the cop on the street. As

Bittner (1991) pointed out, even the most completely impartial police officer “will feel reasonably justified in being more suspicious of the young-poor-Black than of the old-rich-White” (p. 38).

Under these conditions, observers of the Richmond police should not be surprised that a disproportionate percentage of the traffic stops that officers conducted during the data collection period were of African Americans. Although no reasonable person would sanction the stopping of motorists based solely on their race, the dilemma faced by communities such as Richmond is whether to condemn police officers for taking race into account among other variables when race may be a salient predictor of criminal involvement.

As discussed in the methodology section, one limitation of this study is that we did not have baseline traffic violation data available as means for comparison. The National Institute of Justice is currently funding a racial profiling study of the North Carolina State Highway Patrol that is attempting to gather traffic violator information (driver race) through systematic observation of driving behavior (Zingraff, Smith, & Tomaskovic-Devey, 2000). Such baseline data may prove useful for comparison purposes, particularly if there is a close linkage between the reason for the stop and the comparison violation data. In other words, baseline violation data would be most useful for comparison purposes if the violators who made up the study sample had committed the same traffic infraction as those who comprised the comparison population. Comparing the racial characteristics of speeders in the study sample with speeders in the comparison population would be appropriate; comparing red light violators with speeders would be less defensible.

Future researchers interested in racial profiling should also give some consideration to data-gathering techniques that do not involve agency-generated records of traffic stops. As discussed above, racial profiling is such a sensitive issue, both for individual officers and for law enforcement agencies, that the threat of reactivity and bias from official traffic stop records is perhaps an even greater concern than with other kinds of police-generated data. Comparing official traffic stop records to field observations by independent researchers might be a useful strategy in identifying discrepancies, if any, between actual practice and agency-provided data.

APPENDIX
Variables Captured in a Study of
Traffic Stop Records in Richmond, Virginia,
From February 14 to March 31, 2000

	<i>Scale</i>
Driver variables	
Age (year of birth)	interval
Gender	nominal
Race	nominal
Asian	
Black	
Hispanic	
Native American	
Middle Eastern descent	
White (Caucasian)	
Officer variables	
Race	nominal
Asian	
Black	
Hispanic	
Native American	
Middle Eastern descent	
White (Caucasian)	
Gender	nominal
Age	ordinal
1 = 21-25	
2 = 26-30	
3 = 31-35	
4 = 36-40	
5 = 41-45	
6 = 46-50	
7 = 51-plus	
Length of service	ordinal
1 = 0-5 years	
2 = 6-10 years	
3 = 11-15 years	
4 = 16-20 years	
5 = 21-25 years	
6 = 26-plus years	
Shift (day, evening, power)	nominal

	<i>Scale</i>
Event variables	
Census tract of stop	nominal
Reason for stop	nominal
Defects (no city decal, equipment, expired registration or inspection)	
Investigation	
Moving violation	
Disposition of stop (up to three possible)	nominal
Advised (warning)	
On-view felony arrest	
On-view misdemeanor arrest	
Summons issued	
Warrant served	
Mental detention order	
Parking/city decal citation	
DUI arrest	
Offense report	
Miscellaneous report	
Juvenile violation report	
Other report	
Suspension notification issued	
Vehicle towed	
Vehicle searched	
Information received	
Stolen vehicle recovered	
Property found or seized	
Guns/weapons found or seized	
Search conducted (yes or no)	nominal
Type of search conducted	nominal
Consent	
Incident to arrest	
Inventory	
Pat-down	

Note: DUI = driving under the influence.

NOTES

1. After this article was written, an additional 4 weeks worth of data (January 17 to February 13) were made available by the city. These data are analyzed in a subsequent article that will be presented at the April 2001 meeting of the Academy of Criminal Justice Sciences (Smith, Petrocelli, & Piquero, 2001).

2. Although criminal arrests for each racial group were captured in the data set, it is impossible to determine from the data how many persons were actually taken into custody. It is likely that some of the criminal arrests resulted in suspects' being released on summonses rather than being taken into custody. In those cases, officers would not normally search suspects (or their vehicles) incident to arrest (*Knowles v. Iowa*, 1998).

3. The data collection protocol allowed officers to enter up to three dispositions. For example, one stop may have produced two traffic summonses (two moving violations) and one warning (a vehicle defect). Such a stop would have been coded as 1 because it involved at least one arrest or summons.

REFERENCES

- Alpert, G., & Dunham, R. (1999). The force factor: Measuring and assessing police use of force and suspect resistance. *Use of force by police: An overview of national and local data* (pp. 45-60). Washington, DC: National Institute of Justice.
- Bittner, E. (1991). The functions of police in modern society. In C. Klockars & S. Mastrofski (Eds.), *Thinking about police* (2nd ed., pp. 35-51). New York: McGraw-Hill.
- Boydston, J. (1975). *San Diego field interrogation: Final report*. Washington, DC: Police Foundation.
- Christopher Commission. (1991). *Report of the independent commission on the Los Angeles Police Department*. Los Angeles: Author.
- Federal Bureau of Investigation. (1998). *Uniform crime reports*. Washington, DC: Author.
- Flanagan, T., & Vaughn, M. (1995). Public opinion about police abuse of force. In W. Geller & H. Toch (Eds.), *And justice for all: Understanding and controlling police abuse of force* (pp. 113-131). Washington, DC: Police Executive Research Forum.
- Florida Highway Patrol. (2000). Race study of the Florida Highway Patrol [Online]. Available: www.fhp.state.fl.us/html
- Garner, J., Buchanan, J., Schade, T., & Hepburn, J. (1996). *Understanding the use of force by and against the police*. Washington, DC: National Institute of Justice.
- Garner, J., & Maxwell, C. (1999). Measuring the amount of force used by and against the police in six jurisdictions. *Use of force by police: An overview of national and local data* (pp. 25-44). Washington, DC: National Institute of Justice.
- Geller, W., & Scott, M. (1992). *Deadly force: What we know*. Washington, DC: Police Executive Research Forum.
- Harris, D. (1999). The stories, the statistics, and the law: Why "driving while black" matters. *Minnesota Law Review*, 84, 265-326.
- Hepburn, J. (1978). Race and the decision to arrest: An analysis of warrants issued. *Journal of Research in Crime and Delinquency*, 15, 54-73.
- Hindelang, M., Hirschi, T., & Weiss, J. (1979). Correlates of delinquency: The illusion of discrepancy between self-report and official measures. *American Sociological Review*, 44, 995-1014.
- Interim Report of the State Police Review Team Regarding Allegations of Racial Profiling. (1999). Trenton, NJ: Office of the Attorney General.
- Kennedy, R. (1997). *Race, crime, and the law*. New York: Pantheon.
- Knowles v. Iowa*, 525 U.S. 113 (1998).

- Lamberth, J. D. (1997). Report of John Lamberth, Ph.D. *American Civil Liberties Union* [Online]. Available: www.aclu.org/court/lamberth.html
- Mann, C. R. (1993). *Unequal justice—A question of color*. Bloomington, IN: Indiana University Press.
- Martin, S. (1980). *Breaking and entering*. Berkeley, CA: University of California Press.
- McNamara, J. (1967). Uncertainties in police work: The relevance of police recruits' backgrounds and training. In D. Bordua (Ed.), *The police: Six sociological essays* (pp. 163-252). New York: John Wiley.
- McNeely, R., & Pope, C. (1981). Socio-economic and racial issues in the measurement of criminal involvement. In R. McNeely & C. Pope (Eds.), *Race, crime and criminal justice* (pp. 31-47). Beverly Hills, CA: Sage.
- Menard, S. (1987). Short-term trends in crime and delinquency: A comparison of UCR, NCS, and self-report data. *Justice Quarterly*, 4, 455-474.
- Neuman, L. W. (1997). *Social research methods: Qualitative and quantitative approaches*. Boston: Allyn & Bacon.
- New York Attorney General's Office. (1999). *The New York City Police Department's "stop & frisk" practices*. New York: Author.
- Niederhoffer, A. (1967). *Behind the shield*. Garden City, NY: Anchor.
- Osgood, D. W., O'Malley, P., Bachman, J., & Johnston, L. (1989). Time trends and age trends in arrests and self-reported illegal behavior. *Criminology*, 27, 389-417.
- Reiss, A., Roth, J., & Miczek, K. (1994). *Understanding and preventing violence*. Washington, DC: National Academy Press.
- Report of the National Advisory Commission on Civil Disorders. (1968). New York: E. P. Dutton.
- Russell, K. (1998). *The color of crime*. New York: New York University Press.
- San Diego Police Department. (2000). *Vehicle stop study: Mid-year report*. San Diego, CA: Author.
- San Jose Police Department. (1999). *Vehicle stop demographic study*. San Jose, CA: Author.
- Sherman, L. (1980). Causes of police behavior—The current state of quantitative research. *Journal of Research in Crime and Delinquency*, 17(1), 69-100.
- Sherman, L., & Cohn, E. (1986). *Citizens killed by big city police*. Washington, DC: Crime Control Institute.
- Smith, M., Petrocelli, M., & Piquero, A. (2001). *Conflict theory and racial profiling: An empirical analysis of police traffic stop data*. Unpublished manuscript.
- Snyder, H., & Sickmund, M. (1999). *Juvenile offenders and victims: 1999 national report*. Washington, DC: National Center for Juvenile Justice.
- Tonry, M. (1995). *Malign neglect*. New York: Oxford University Press.
- Walker, S. (1999). *The police in America: An introduction*. New York: McGraw-Hill.
- Whren v. United States, 517 U.S. 806 (1996).
- Wilbanks, W. (1987). *The myth of a racist criminal justice system*. Monterey, CA: Brooks/Cole.
- Worden, R. (1995). The "causes" of police brutality: Theory and evidence on police use of force. In W. Geller & H. Toch (Eds.), *And justice for all: Understanding and controlling police abuse of force* (pp. 31-60). Washington, DC: Police Executive Research Forum.
- Zingraff, M., Smith, W., & Tomaskovic-Devey, D. (2000). North Carolina highway traffic and patrol study: "Driving while black." *Criminologist*, 25(3), 1-4.

Michael R. Smith is an associate professor in the Department of Criminal Justice at Virginia Commonwealth University. He holds a J.D. from the University of South Carolina and a Ph.D. in Justice Studies from Arizona State University. He is a former police officer and has conducted a variety of police-related research and evaluation projects. His primary areas of interest include police use of force and civil rights. Recent publications have appeared in Police Quarterly, Policing: An International Journal of Police Strategies & Management, and Crime & Delinquency.

Matthew Petrocelli is an assistant professor in the Department of Criminal Justice Administration at California State University, Hayward. His academic credentials include a B.S. from the United States Military Academy at West Point, an M.C.J. from the Graduate School of Public Affairs at the University of Colorado, Denver, and a Ph.D. from the School of Justice Studies at Arizona State University. A former Army officer, his research interests center around law enforcement and the police subculture.